NGA Assists in TSUNAMI DISASTER Relief and Recovery

By Paul Hurlburt

When reports of a magnitude-9.0 earthquake and resulting tsunami striking the Indian Ocean reached the United States Dec. 26, NGA sprang into action. Contingency plans were activated to ensure that mariners and relief workers entering the affected landmasses had the best possible understanding of the situation they would encounter and that national and international leadership had the best information at hand to assist them in determining where to send help.

The Agency tapped both national and commercial sources to provide the most complete, timely and accurate information. Analysts used national imagery to assess damage to specific structures while products derived from commercial imagery showed the overall scope of the damage—called "apocalyptic devastation and destruction" by NGA's Director, retired Air Force Lt. Gen. James R. Clapper Jr.

NGA provided imagery products of the affected areas to the Agency for International Development's Office of Foreign Disaster Assistance (OFDA), U.S. Pacific Command (PACOM)—in whose region the tsunami occurred—and other government agencies. Many NGA products were also shared with the United Nations and international relief organizations.

Assessing Damage

NGA products were critical to PACOM and U.S. Transportation Command (TRANSCOM) officials, who said their relief effort was one of the most complex ever mounted by American forces. PACOM sent an aircraft carrier battle group and a helicopter carrier expeditionary fleet, along with scores of cargo planes, to the scene. Ten days after the tsunami struck, more than 20 ships and 75 aircraft, and more than 13,000 U.S. soldiers, sailors, airmen and Marines had deployed to help provide relief.

An air crewman passes out supplies to locals in a village just inland from the coast of the Island of Sumatra, Indonesia. U.S. Navy photo by Photographer's Mate 3rd Class M. Jeremie Yoder.

NGA analysts assessed how the damage from the tsunami affected access into and out of the damaged areas. The Navy used NGA satellite images to identify sandy beaches where supplies might be brought ashore by landing craft when local ports were blocked. NGA also assessed damage to infrastructure, such as roads, bridges, ports and airfields. In preparing maps based on the latest satellite imagery, analysts in the Analysis and Production Directorate's Readiness, Response and Recovery Branch determined that at least 50 or 60 percent of the bridges and roads in the affected area were unusable. These maps were delivered to relief workers instantly over the Internet.

"It's critical to provide information to folks that are bringing in relief," said public affairs officer Stephen Honda. "We can look at airports to see if the airfield is damaged to prevent aircraft from landing, or tell if there are hazards in harbors that would prevent ships from coming in."

Warning Mariners

Mariners look to NGA for warnings about hazards in their area of operation. "Notices to Mariners" are transmitted to both Navy and merchant marine ships 24 hours a day by the Agency's Maritime Safety Division.

Left: A Landing Craft Air Cushion (LCAC) departs a beach landing area in Meulaboh, Indonesia after delivering disaster relief supplies. U.S. Navy photo by Chief Photographer's Mate Jerry Woller.

A Dec. 29 notice warned that ports of call could be heavily damaged "to include unknown new bottom configurations, ship wrecks, shoreline changes and depth limitations." The notice also said "aids to navigation may be damaged, inoperable, off station or even destroyed. . . . Proceed with extreme caution." Follow-up notices provided more specific information as it became available. Wrecks and debris fill port and coastal waters throughout the region, and many buoys and other navigational aids were washed away.

Re-charting Affected Areas

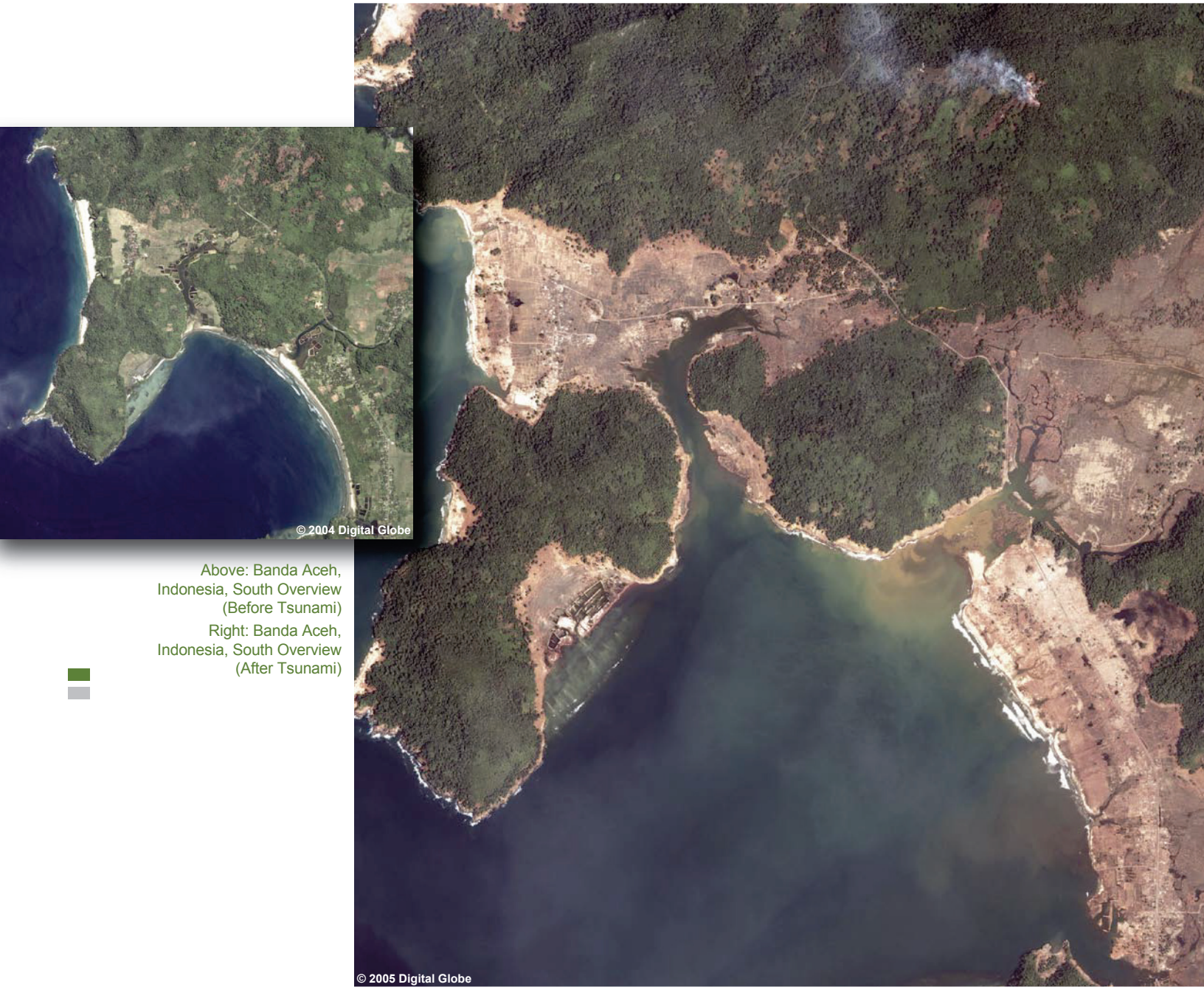
Besides debris and damage to infrastructure, both satellite imagery and the on-site reports collected by Maritime Safety revealed an area that no longer matches existing maps and charts.

"We see massive erosion of the islands," said NGA Hydrographer Chris Andreasen. "That sediment had to go somewhere, so I'd expect shoaling in channels and areas were vessels typically try to navigate."

To re-chart shipping channels and ports, the Navy deployed two ships equipped with sonar immediately after the tsunami. More extensive surveys of the entire region will take years, according to Andreasen. "We've never seen anything like this before."

Although NGA has produced satellite maps to indicate damaged areas, a more time-consuming task awaits. Officials say it will take years to re-chart the Indian Ocean's transfigured islands, coastlines and ports. The massive undertaking is sure to involve partnerships with many of the countries in the region.

"Coproduction is certainly the way ahead for re-mapping many of the areas affected by the tsunami," said Jay Moeder, NGA's Issue Manager for South and Southeast Asia. "Currently, discussions are under way with regional partners to establish a



Above: Banda Aceh, Indonesia, South Overview (Before Tsunami)

Right: Banda Aceh, Indonesia, South Overview (After Tsunami)

prioritized production effort to provide new charts and maps in the most timely and efficient manner."

GEOINT's Value

Geospatial intelligence proved invaluable in providing immediate support to the many agencies responding to this natural calamity. Now it will play a role in the re-building of the region as the Agency begins the process of updating the mapping and charting products of the region.

"I want to thank everyone at NGA whose hard work is helping to produce geospatial intelligence that will make a difference in this time of great need. The work that we are doing to support Tsunami relief efforts is the right thing to do—and it is our duty," Clapper said in an e-mail to employees.